of the development roller 11 by 200V. Consequently, toner on the supply roller
13 is transferred to the development roller 11, and on the surface of the
development roller 11, a toner layer of specified layer thickness is formed.
Toner of the development roller 11 develops a latent image on a photoreceptor 1
at a development position facing the photoreceptor 1.

CLIPPEDIMAGE= JP411024388A
PAT-NO: JP411024388A
DOCUMENT-IDENTIFIER: JP 11024388 A
TITLE: DEVELOPING DEVICE

PUBN-DATE: January 29, 1999

INVENTOR-INFORMATION:
NAME
AOKI, KATSUHIRO

ASSIGNEE-INFORMATION:

NAME	COUNTRY
RICOH CO LTD	N/A

APPL-NO: JP09197908
APPL-DATE: July 8, 1997

INT-CL_(IPC): G03G015/08

ABSTRACT:
PROBLEM TO BE SOLVED: To obtain a stable developing characteristic by performing binary development through the use of a developer carrier in which specific grains are dispersed in the front layer of a substrate made of a specific conductive material so as to expose at least a part of the specific grains to the surface of the front layer.

SOLUTION: The substrate 3a of a developer carrier is made of a conductive material whose volume resistivity is ≤10<SP>5</SP> Ω.cm and also binary development is performed by using the developer carrier in which grains 8 which are ≥10<SP>6</SP> Ω.cm in the volume resistivity and ≤20 μm in the grain diameter (a) are dispersed on the front layer of the substrate 3a, so as to expose at least a part of the grains 8 to the surface 3b of the front layer. Therefore, a developing electric field between a latent image on a photoreceptor drum and the developer carrier can be stressed. Thus, even if a developing potential is changed, the concentration of

the developing
electric field on an optical writing dot on the photoreceptor drum is
mitigated. Further, the volume resistivity of the grains 8 dispersed on the
front layer is increased to suppress the concentration and also a developer
supplied from a developer supplying member is triboelectrified to increase the
supply rate of the developer.

CLIPPEDIMAGE= JP409197781A
PAT-NO: JP409197781A
DOCUMENT-IDENTIFIER: JP 09197781 A
TITLE: IMAGE FORMING DEVICE

PUBN-DATE: July 31, 1997

INVENTOR-INFORMATION:
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MURASAWA, YOSHIHIRO

ASSIGNEE-INFORMATION:

NAME	COUNTRY
CANON INC	N/A

APPL-NO: JP08026112
APPL-DATE: January 19, 1996

INT-CL_(IPC): G03G015/06; G03G015/00

ABSTRACT:
PROBLEM TO BE SOLVED: To assure not to have degradation of developability due
to fluctuation of SD intervals by inserting a parallel connected capacitor and
resistor into the output side of a bias power source.

SOLUTION: A developers are fixed to an image forming device body and the layer
thickness of the developer layer on a developer carrying member is smaller than
the spacing between the developer carrying member and image carrying member in
a developing section. A bias power source 7 is constituted by inserting the
parallel connected capacitor C1 and resistor R into the output side of a series
connected AC voltage source EAC and DC voltage source EDC. According to such
bias power source 7, the VP impressed on a developing sleeve is
VPP=VPP<SB>0</SB>×C<SB>1</SB>/(C<SB>1</SB>+C<SB>2</SB>) if the
electrostatic capacity of the capacitor C1 is C1 as it is when VPP on the bias
power source 7 side is defined as VPP<SB>0</SB>. According thereto, the term
of the electrostatic capacity increases if the SD intervals increase and the

electrostatic capacity C2 between the SD decreases and, therefore, the VPP
increases and the developability by developing biases is enhanced.

CLIPPEDIMAGE= JP411084845A
PAT-NO: JP411084845A
DOCUMENT-IDENTIFIER: JP 11084845 A
TITLE: IMAGE FORMING DEVICE AND PROCESS CARTRIDGE

PUBN-DATE: March 30, 1999

INVENTOR-INFORMATION:
NAME
TAWADA, TAKAAKI

ASSIGNEE-INFORMATION:
NAME COUNTRY
RICOH CO LTD N/A

APPL-NO: JP09262857
APPL-DATE: September 10, 1997

INT-CL_(IPC): G03G015/08; G03G015/08 ; G03G021/18

ABSTRACT:
PROBLEM TO BE SOLVED: To provide an image forming device capable of facilitating an operation of a process cartridge at an initial set up time with reference to an image forming device main body.

SOLUTION: A sealing member exposing port 200c for exposing a holding part 5b for the sealing member 5 outside the image forming device main body is installed in a cover 200b for the image forming device main body 200. And in a delivery state, the process cartridge 100 is loaded in the image forming device main body 200 while exposing the holding part 5b for the sealing member 5 through the sealing member exposing port 200c. Thus, an operation of unsealing the sealing member 5 of the process cartridge 100 is made possible from the outside of the image forming device main body 200 while keeping the cover 200b closed, without executing such a troublesome operation of taking out the process cartridge 100 from the image forming device.

CLIPPEDIMAGE= JP410221914A
PAT-NO: JP410221914A
DOCUMENT-IDENTIFIER: JP 10221914 A
TITLE: COLOR IMAGE FORMING DEVICE AND TONER USED IN THE SAME

PUBN-DATE: August 21, 1998

INVENTOR-INFORMATION:
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TAKAGAKI, HIROMITSU
HANADA, MOTONORI

ASSIGNEE-INFORMATION:
NAME COUNTRY
RICOH CO LTD N/A

APPL-NO: JP09026922
APPL-DATE: February 10, 1997

INT-CL_(IPC): G03G015/01; G03G015/01 ; G03G015/01 ; G03G009/09

ABSTRACT:
PROBLEM TO BE SOLVED: To stabilize and optimize color reproducibility for each color with a simple circuit constitution and at a low part cost without requiring troublesome adjusting operation in a tandem type electrophotograhic system color image forming device.

SOLUTION: On the assumption of so-called saturation exposure by means of an image exposing device 9, a developing bias is impressed on at least two or more developing devices 10 of electrophotographic process part (toner developed image forming part) 6 with the potential difference of 0V by means of the same power source device 13 for impressing the developing bias. Thus, the circuit constitution becomes simple, and the part cost is lowered. Since the so-called saturation exposure is performed even though toner characteristic for each color is different and the potential difference of the developing bias to the developing device 10 of each color is 0V; the color

reproducibility for each
color is stabilized and optimized and the troublesome adjusting operation is
not required in terms of the developing bias of each color.

CLIPPEDIMAGE= JP406027778A
PAT-NO: JP406027778A
DOCUMENT-IDENTIFIER: JP 06027778 A
TITLE: IMAGE FORMING DEVICE

PUBN-DATE: February 4, 1994

INVENTOR-INFORMATION:
NAME
SUZUKI, HIROYUKI
NAGASE, YUKIO
WAKI, KENICHIRO
HIBINO, MASARU
NAKANO, MASAO

ASSIGNEE-INFORMATION:
NAME COUNTRY
CANON INC N/A

APPL-NO: JP04196268
APPL-DATE: June 30, 1992

INT-CL_(IPC): G03G015/01; B41J002/525 ; G03G015/00 ; G03G015/04 ; G03G015/04
; G03G015/06 ; G03G015/09 ; G03G021/00 ; H04N001/29
US-CL-CURRENT: 399/49,399/178

ABSTRACT:
PURPOSE: To provide an image of high picture quality with a favourable color reproduction property and without causing any problems of blur and other of letters and lines even in a multiple color mode to transfer a developed image to a transcribing material in the lump by way of forming the multiple color developed image on an image holding body.

CONSTITUTION: To a development roller 11, bias voltage which direct current voltage of +340V is superimposed on alternating voltage of 200Hz, 1300Vpp is applied, additionally, direct current voltage of +260V is applied between the development roller 11 and a supply roller 13, and bias is set so that electric potential of the supply roller 13 always becomes higher than electric potential

US-CL-CURRENT: 399/265

US-PAT-NO: **5689784**
DOCUMENT-IDENTIFIER: US 5689784 A
TITLE: Non-contacting, non-magnetic, Mono-component developing apparatus
DATE-ISSUED: November 18, 1997
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Shin; Kyu-chul	Seoul	N/A	N/A	KRX
Kim; Kyung-hwan	Seoul	N/A	N/A	KRX

US-CL-CURRENT: 399/285,399/265
ABSTRACT:
An electrophotography developing apparatus of non-contacting type using a nonmagnetic one-component toner is provided. The developing apparatus adopts a soft roller as a developing roller and a developing **gap** of 50-200 .mu.m is formed between a developing drum and developing roller. A desirable image can be provided by adopting the soft roller as the developing roller and properly setting the developing **gap** between the developing roller and the developing drum. Generally, the electrophotography developing apparatus is used in the apparatus for printing and communicating, such as a duplicator, a printer and a facsimile.
2 Claims, 7 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 4

DWKU:
5689784

ABPL:
An electrophotography developing apparatus of non-contacting type using a nonmagnetic one-component toner is provided. The developing apparatus adopts a soft roller as a developing roller and a developing **gap** of 50-200 .mu.m is

formed between a developing drum and developing roller. A desirable image can be provided by adopting the soft roller as the developing roller and properly setting the developing **gap** between the developing roller and the developing drum. Generally, the electrophotography developing apparatus is used in the apparatus for printing and communicating, such as a duplicator, a printer and a facsimile.

BSPR:
FIGS. 1-4 show examples of an electrophotography conventional developing apparatus, in which a non-magnetic mono-component developing method according to the conventional art is employed. The ordinary developing apparatus is composed of a developing roller for developing a latent image formed on a photosensitive drum by moving the toner, a supplying roller for supplying the toner on the developing roller, and a doctor blade for forming a **thin** toner layer on the developing roller.

BSPR:
FIG. 2 shows an example where a hard developing roller 11' effects the development in a non-contacting state, being separated from photosensitive drum 5 by a developing **gap** a. Here, the developing roller is made of a metal such as aluminum or stainless steel. These materials are electrically conductive so that a biasing means 8 may provide a DC current, an **AC** current or some combination thereof, for application to photosensitive drum 5. In FIG. 2, reference numeral 4' is an elastic doctor blade. The developing apparatus of FIG. 2 does not employ a toner supplying roller.

BSPR:
FIG. 4 shows an example of a photosensitive apparatus using a toner-flying developing method where the developing roller 11' operates at a constant **gap** from photosensitive drum 5. Here, biasing means 8 causes the

toner 3 on
developing roller 11' to "jump" onto the drum by a DC voltage applied across
developing roller 11' and photosensitive drum 5. In the apparatus of FIG. 4,
the developing roller 11' is made of aluminum or stainless steel and a
non-magnetic toner is used. Also, doctor blade 4' is elastic.

BSPR:
First, the problems related to the case of the contact development will be
discussed. The photosensitive body and the developing roller revolve while
contacting each other. Generally, the developing roller revolves at a higher
speed than the photosensitive drum. Here, the "contact" development actually
has a developing **gap** which is generally equal to about one to two layers of
toner, and consequentially there is nipping action between the soft roller and
the photosensitive drum. As described above, the developing roller must
revolve at a higher speed than the photosensitive drum, since the toner supply
to the photosensitive drum would be insufficient were it to revolve at the same
speed, and an inadequate supply of charged toner means that the obtained image
is insufficiently dense, making for an image of poor quality. That is, a large
amount of toner has to be supplied to the photosensitive drum by revolving the
developing roller at the higher speed, in order to provide an image in
sufficient concentration. However, since the developing roller and the
photosensitive drum revolve at different speeds, friction is generated, which
causes undue wear and reduces the lifetime of the photosensitive drum. The
friction and resulting surface deterioration also adversely affects the toner
supply such that the application thereof is uneven due to variations in the
surface roughness of the circumference of the developing roller. Moreover,
unwanted frictional charging and the developing characteristics of the toner

are degraded.

BSPR:
Further in the case of the contact development, it is difficult to maintain a constant revolving speed of the developing roller, such that the linear velocity thereof is easily changed. As a result, inconsistent amounts of toner are supplied, whereby an image having an even **density** throughout cannot be provided. Furthermore, the above-described friction applies a load of opposing direction to its revolving to the developing roller, and another load of coinciding direction with its revolving to the photosensitive drum. Such loads result in a loss of power.

BSPR:
Additionally in the case of the contact developing, the interval between the photosensitive body and the developing roller is equal to about one to two times the **diameter** of toner particle. Here, the field strength in the **gap** between the photosensitive drum and the developing roller, that is, in the space for developing, is much stronger, by as much as several times, for a line image than for a solid image. Thus, after developing, the line image exhibits a higher concentration than does the solid image, which is good for a printer or facsimile dealing with a digital image. However, due to poor tonal gradation, the above characteristic is not suitable for a duplicator requiring a soft image output.

BSPR:
Another unsolved problem in the electrophotography developing method is that the consistent quality of both line and solid images cannot be obtained simultaneously. Thus, a method giving priority to one (line image or solid image) is adopted. Generally, the priority is given to the line (or dot) image in the case of printers and facsimiles, and to the solid image in

the case of
the duplicator, when setting up the field strength and the developing **gap**.

BSPR:
The developing roller is roughly classified into hard and soft rollers. The
hard roller is typically made of stainless steel or aluminum and is
electrically conductive, and has a proper surface roughness. For hard rollers,
synthetic rubber is used for the doctor blade for the toner layer. However, in
this case, the amount of specific **charge** of the toner is small, that is, only
10 .mu.C/g or below. If the specific **charge** is small, a smooth image cannot be
obtained due to the poor tonal gradation. Also, toner easily assume
opposite-polarity, many problems are generated, such as the violent flinging
(flying) of the toner and contamination of the image's background which lower
image quality, as well as reduced machine lifetime and an increased possibility
of malfunction. Since there is a concern about contact between the
photosensitive body and the developing roller, the developing **gap, that is, the**
gap between the surface of the photosensitive body and that of the developing
roller, cannot be shortened beyond a certain limit.

BSPR:
In the case of the conventional hard roller, the developing **gap** is ordinarily
set above 0.2 mm. Here, the above-described field strength is stronger for
solid images than line images, thereby producing an indistinct line image.
Also, since the developing roller is conductive, the field strength is
sensitively varied in accordance with the developing **gap,** which requires very
high machining precision for the developing roller. Thus, it is difficult to
obtain images having an even concentration with an ordinary machining
precision, due to severe variations in image concentration.

BSPR:
In the case of the soft roller, the major component of the soft roller is
polyurethane rubber or silicon rubber and various functional additives are
added therein so as to have semi-conductivity with the specific resistance of
10.sup.7 -10.sup.8 .OMEGA..multidot.cm. In the same way, the surface of the
soft roller is machined to have the same surface roughness as the size of the
toner particles (5-10 .mu.m), in order to actively form the toner layer. Here,
a solid bar, an elastic board, or a doctor blade in the shape of a roller is
installed as means for forming the toner layer, and a polyurethane sponge is
used as means for charging the toner. Here, the amount of specific **charge** of
the toner can be increased to 20-40 .mu.C/g. Recently, a soft roller having
the same specific **charge** of the toner as that of the bi-component developing
method using a magnetic brush was achieved by increasing the specific **charge** of
the toner as much as possible.

BSPR:
If a toner having a high specific **charge** is used, most of the above problems
can be overcome. That is, an image having excellent tonal gradation can be
provided, the flying of toner is decreased and the generation of opposite-polarity toner is decreased, whereby a high quality image without
contamination in the background can be provided. Also, in the case of the soft
roller, the photosensitive body is not damaged even though the soft roller
contacts the photosensitive body. As a result, the developing **gap** can be
freely set to the optimum state, without regard to solid-image or line-image
priority.

BSPR:
Since the rubber used in the soft roller is a semi-conductive material, the
sensitivity to the field strength of the developing **gap** is not

high. Thus,
high quality images with even concentration can be obtained with the ordinary
machining precision.

BSPR:
The non-magnetic mono-component developing apparatus according to the present
invention comprises: a developing rubber roller made of an elastic rubber
having a semi-conductivity and having the same surface roughness as that of a
toner particle; a toner supplying roller made of a foam-type material for
supplying the toner and charging the toner by a friction according to nipping
with the developing rubber roller; doctor means for forming a **thin** toner layer
on the surface of the developing rubber roller while contacting the developing
rubber roller; a photosensitive drum maintaining a developing **gap** between the
drum and the developing rubber roller so that developing of an image is
performed without contact with the developing rubber roller; and an electric
power source for applying a predetermined bias voltage across the developing
rubber roller, the toner supplying roller and the photosensitive drum.

BSPR:
As a result of the above constitution according to the present invention, a
problem related to the friction between the photosensitive drum and the
developing roller can be solved. Also, a problem of unevenness in the image
concentration sensitively affected by the field strength can be overcome by
using the soft roller. Also, excellent image quality for both solid and line
images can be produced by properly setting the developing **gap**. In other words,
the developing apparatus for use in electrophotography according to the present
invention eliminates the disadvantages existing when the contact developing
method using a hard roller is employed.

DEPR:
FIG. 5 is a schematic cross-sectional view showing the important portions of
the developing apparatus according to the present invention. The electrophotography developing apparatus according to the present invention
comprises a developing rubber roller 1 revolving counterclockwise, a toner
supplying roller 2 revolving clockwise while contacting one side of developing
rubber roller 1, a doctor blade 4a for controlling the amount of toner in
contact with the upper portion of developing rubber roller 1, a photosensitive
drum 5 revolving clockwise while having a constant **gap** G from the other side of
developing rubber roller 1, a housing 7 containing a revolving toner mixer 6,
for supplying the toner to a toner supplying chamber located behind a bulkhead
via a toner supplying hole 71, and an electric power source 8 for applying the
voltage across photosensitive drum 5, developing rubber roller 1 and toner
supplying roller 2.

DEPR:
In the developing region, the toner is selectively attached in accordance to an
electrostatic latent image formed on photosensitive drum 5 and the strength of
coulomb force caused by the developing bias voltage applied across developing
rubber roller 1 and photosensitive drum 5. Here, since the **gap** as much as a
predetermined developing **gap** G is provided between photosensitive drum 5 and
developing rubber roller 1, the developing process is performed in a state
where photosensitive drum 5 and developing rubber roller 1 do not contact each
other. Developing **gap** G is set to be a little broader than the height of the
toner layer to be formed on the surface of developing rubber roller 1. The
number of toner layers formed on developing rubber roller 1 is generally one or
two. It is desirable that the position of photosensitive drum 5, without
contacting with the toner layers, is separated from developing

rubber roller 1,
by as much as four to five times the **diameter** of toner particle. Thus, if the
conventional toner particle with **diameter** of 10 .mu.m is used, the developing
gap is set apart from the developing rubber roller, by as much as 40-50 .mu.m.

DEPR:
The developing **gap** has to be properly set to produce an image having an optimum
developing characteristic in which field strengths of solid and line images are
nearly the same to provide the same level of concentration in all of solid and
line images. The optimum developing **gap** can be changed in accordance with
density of line image, line **thickness,** and the surface electric potential of
photosensitive body. That is, the higher **density** and the less line **thickness**
are, the narrower developing **gap** is. The width of this developing **gap** is much
narrower than non-contacting developing **gap** using the hard roller and is about
50-200 .mu.m. Also, the maximum allowable developing **gap** is set such that the
field strength of line image is not zero, that is, the field strength can be
maintained as much as several tens percentages of that of solid image.

DEPR:
As shown in FIGS. 5-7, the voltage applied to developing rubber roller 1 can be
an **alternating** current voltage to raise the developing efficiency, which easily
separates the toner by disturbing the toner layer attached on developing rubber
roller 1 using an electrical force at the developing region. Also, the direct
current voltage is applied to toner supplying roller 2 to raise the toner
supplying efficiency together with the amount of specific **charge** of toner.
Furthermore, if the developing bias voltage is applied as a spherical wave and
the duty thereof is adjusted, the image in a desirable concentration without

the contamination of background can be obtained.

CLPR:
2. The developing apparatus of claim 1, wherein said image is comprised of
solid areas and line areas and wherein said image **density** of each of said areas
is maximized and uniform when said developing **gap** is between 50-100 .mu.m.

CLPV:
doctor means for forming a uniformly **thin** toner layer on the surface of said
developing roller while contacting said developing roller;

CLPV:
a photosensitive drum which is maintained at a developing **gap** between said drum
and said developing roller so that developing of an image on said drum is
performed without contact with said developing roller;

CLPV:
an electric power source for applying a predetermined bias voltage across said
developing roller, said toner supplying roller and said photosensitive drum,
wherein said bias voltage is a combination of a direct current and an
alternating current, with said developing roller and said drum having said
alternating current applied thereto and said toner supplying roller having a
direct current applied thereto, whereby image **density** is increased as said **gap**
is decreased, wherein said **gap** is no more than five times a mean **diameter** of
said particles.

US-CL-CURRENT: 430/126

US-PAT-NO: 6087056
DOCUMENT-IDENTIFIER: US 6087056 A
TITLE: Developing method by flying toner
DATE-ISSUED: July 11, 2000
INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Toyoshima; Tetsuro	Soraku-gun	N/A	N/A	JPX
Iwamatsu; Tadashi	Nara	N/A	N/A	JPX
Azuma; Nobuyuki	Ibaraki	N/A	N/A	JPX
Fujita; Hideaki	Tenri	N/A	N/A	JPX
Yamanaka; Takayuki	Tenri	N/A	N/A	JPX

US-CL-CURRENT: 430/102,430/126
ABSTRACT:

A toner which can exhibit 5 nN or less of inter-particle force calculated by the following equation (1) when the toner is laminated and carried on a toner carrier:

Fv=q.multidot.E-Fi (1)

where Fv is an inter-particle force, q.multidot.E is a Coulomb force calculated by the following equation:

q.multidot.E=q.multidot.[Vb+(Q/M).multidot..delta..multidot.P.mul ub.1.sup.2 /(2.epsilon.o.epsilon..sub.T)]/(.epsilon..sub.T .multidot.g+dt.sub.1) (2)

where Fi is an image-force calculated by the following equation (3):

Fi=[(W.sub.1 .multidot..pi.d.sup.3 .multidot..delta.)/(6 .epsilon.o .epsilon..sub.T)].multidot.(Q/M).sup.2 (3)

where q is a quantity of charge [C] of the toner particle to be developed, E

is an electric field strength [V/m] acting on the toner layer, Q/M is a **toner charge**-to-mass ratio [mC/g], W.sub.1 is an amount of toner separated by development among the toner laminated and carried on the toner carrier, .epsilon.o is a vacuum dielectric constant [C/(V.multidot.m)], .epsilon..sub.T is an apparent specific dielectric constant [C/(V.multidot.m)] of the toner layer, d is an average particle size [.mu.m] of the toner, .delta. is a true **density** [g/cm.sup.3] of the toner, g is a **gap** [mm] between the outermost surface of the toner on the toner carrier and the electrostatic latent image holder, dt.sub.1 is a thickness [.mu.m] of the toner layer on the toner carrier, Vb is a development **bias voltage** [V] and P is a toner packing rate.

The present invention provides a toner and a non-contact developing method using the same which realize stable flying-development by suppressing to 5 nN or less the inter-particle force of the toner other than the

image-force acting on the toner laminated and carried on the toner carrier.

16 Claims, 14 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 12

ABPL:
where q is a quantity of charge [C] of the toner particle to be developed, E is an electric field strength [V/m] acting on the toner layer, Q/M is a **toner charge**-to-mass ratio [mC/g], W.sub.1 is an amount of toner separated by development among the toner laminated and carried on the toner carrier, .epsilon.o is a vacuum dielectric constant [C/(V.multidot.m)], .epsilon..sub.T is an apparent specific dielectric constant [C/(V.multidot.m)] of the toner layer, d is an average particle size [.mu.m] of the toner, .delta. is a true **density** [g/cm.sup.3] of the toner, g is a **gap** [mm] between the

outermost
surface of the toner on the toner carrier and the electrostatic latent image
holder, dt.sub.1 is a thickness [.mu.m] of the toner layer on the toner
carrier, Vb is a development **bias voltage** [V] and P is a toner packing rate.

BSPR:
It is a further object of the present invention to provide a toner which allows
the non-contact development within the range in which a **toner charge**-to-mass
ratio is 5 .mu.C/g to 15 .mu.C/g, the thickness of the toner laminated and
carried on the toner carrier is about 5 .mu.m to 20 .mu.m and the packing
density thereof is about 0.4 g/cm.sup.3 to 0.85 g/cm.sup.3.

DEPR:
The **toner preferably has a charge**-to-mass ratio within the range of 5 .mu.C/g
to 15 .mu.C/g, the thickness of the toner laminated and carried on the toner
carrier within the range of about 5 .mu.m to 20 .mu.m and a packing **density**
within the range of about 0.4 g/cm.sup.3 to 0.85 g/cm.sup.3 because the
developability is enhanced thereby.

DEPL:
where so is the vacuum dielectric constant [8.85.times.10.sup.-12 C/(V.multidot.m)], ET is an apparent specific dielectric constant of the toner
layer, d is the particle size of the toner, .delta. is a true **density** of the
toner, Q/M is a **toner charge**-to-mass ratio (quantity of charge per unit mass),
Fv is an inter-particle force of the toner, i.e., a flying restricting force
other than the image-force at the flying section, dt.sub.1 is a thickness of
the toner on the toner carrier, Vb is a development **bias voltage,** P is a toner
packing rate and g is the **gap** between the outermost surface of the toner on the
toner carrier and the electrostatic latent image holder.

CIPC:

G03G015/08